1 Introduction

This revised edition of the Primer provides information on the relative risk site evaluation framework being used by the Department of Defense (DoD), in concert with stakeholders, to help sequence environmental restoration work at sites at active military installations, Base Realignment and Closure (BRAC) installations, and formerly used defense properties. It describes the structure and logic underpinning the framework and provides detailed instructions for conducting relative risk site evaluations in the field. It also describes how removal and remedial actions should be factored into relative risk site evaluations.

This document is a product of the Interservice Relative Risk Working Group¾ comprised of representatives from the Army, Navy, Air Force, and Defense Logistics Agency¾ that was formed in May 1994 to develop concepts and implementation procedures for the relative risk site evaluation framework.

This revised edition of the Primer replaces the *Relative Risk Site Evaluation Primer (Interim Edition, Summer 1994)* issued in September 1994, in its entirety. It contains enhanced technical guidelines for performing relative risk site evaluations which have been added in response to DoD initiatives as well as questions and comments received from DoD field elements, regulatory agencies, and stakeholders during the first twenty months of relative risk implementation.

The audience within DoD includes remedial project managers and other environmental personnel responsible for planning, executing, and evaluating environmental restoration activities at DoD installations and formerly used defense sites (FUDS). The audience outside DoD includes federal and state regulatory agencies, local governments, and public stakeholders living or working in the vicinity of DoD installations and FUDS.

1.1 Definition of Relative Risk Site Evaluation

The relative risk site evaluation framework is a methodology used by all DoD Components to evaluate the relative risk posed by a site in relation to other sites. It is a tool used across all of DoD to group sites into high, medium, and low categories based on an evaluation of site information using three factors: the contaminant hazard factor (CHF), the migration pathway factor (MPF), and the receptor factor (RF). Factors are based on a quantitative evaluation of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) hazardous substances, pollutants, or contaminants and a qualitative evaluation of pathways and human and ecological receptors in the four media most likely to result in significant exposure¾ groundwater, surface water, sediment, and surface soils. A representation of this evaluation concept is presented in Figure 1. Figure 1 also depicts possible opportunities for stakeholder input into the technical evaluation.

The relative risk site evaluation framework is a qualitative and easy to understand methodology for evaluating the relative risks posed by sites and should not be equated with more formal risk assessments conducted to assess baseline risks posed by sites. It is a tool to assist in sequencing environmental restoration work (i.e., known requirements such as remedial investigation or cleanup actions) to be done by a DoD Component. It is

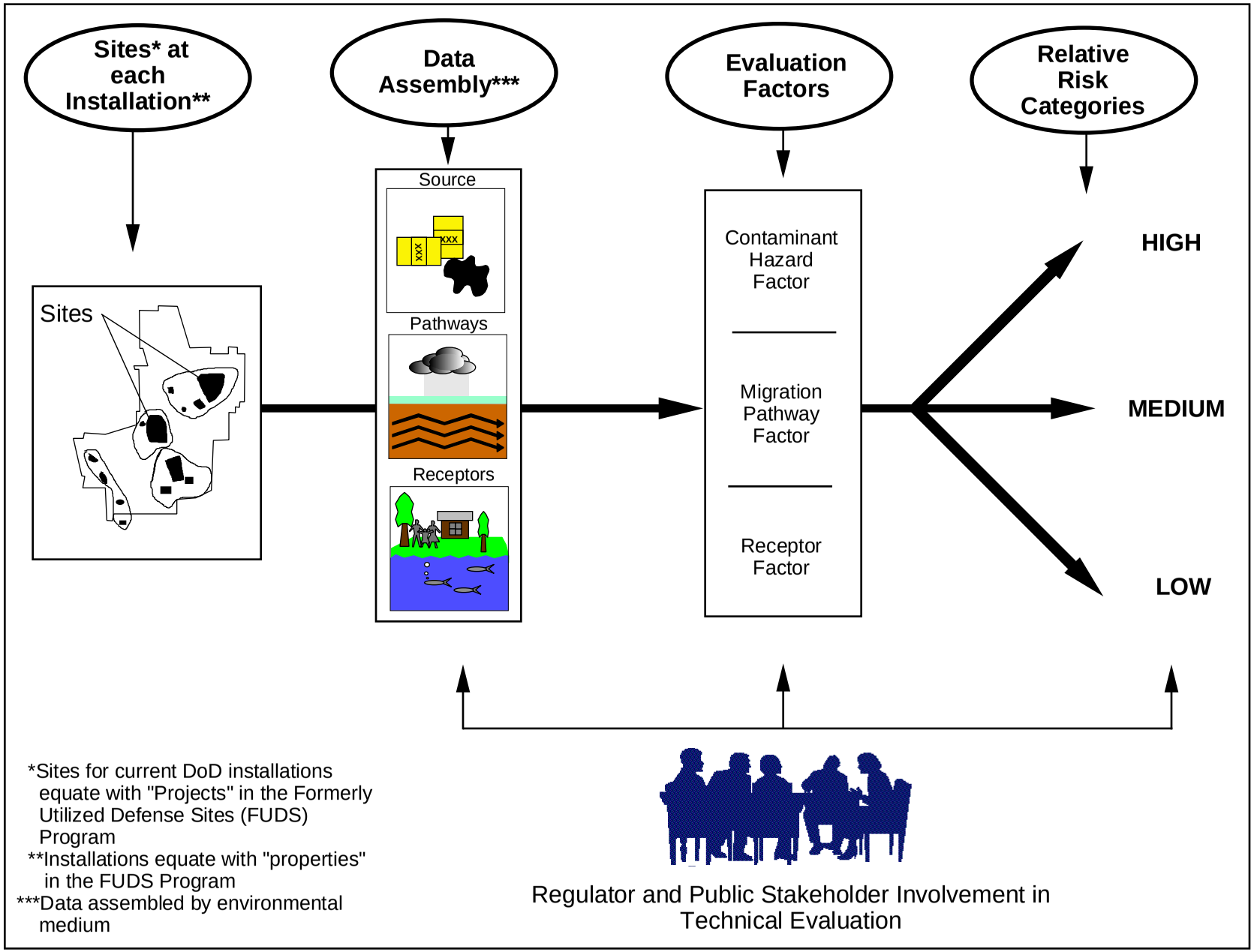

Figure 1. Relative Risk Site Evaluation Concept Summary

designed to handle the broad range of sites that exist at DoD installations and the broad range of data available. Like any risk evaluation tool and perhaps more so than a comprehensive risk assessment, the relative risk site evaluation framework makes use of assumptions and approximations. Users should bear these limitations in mind when applying the framework. Relative risk is not the sole factor in determining the sequence of environmental restoration work, but it is an important consideration in the priority setting process. It should be factored into all priority setting decisions, and should be discussed with regulators and public stakeholders in the environmental restoration process, such as those mentioned above. The grouping of sites into high, medium, or low relative risk categories **is not** a substitute for either a baseline risk assessment or health assessment; **it is not** a means of placing sites into a Response Complete/No Further Action category; and **it is not** a tool for justifying a particular type of action (e.g., the selection of a remedy).

The relative risk site evaluation framework is used by all DoD Components to assess site relative risks at installations and formerly used defense properties. Use of the framework and resulting relative risk information allows DoD and DoD Components to communicate and help establish priorities for environmental restoration work.

The actual funding priority for a site is identified after relative risk information is combined with other important risk management considerations (e.g., the statutory and regulatory status of a particular installation or site, public stakeholder concerns, program execution considerations, and economic factors). A list of common risk management considerations can be found in Appendix E, page 39. These additional risk management considerations can result in a decision to fund work at a site that is not classified as a high relative risk. DoD Components have each developed guidelines for combining relative risk and risk management considerations as part of their planning, programming, and budgeting process. The planning, programming, and budgeting process within DoD is outlined in Appendix E, page 16.

The relative risk site evaluation framework does not address the question of whether work is necessary at a site; it only provides information for use in helping to determine the general sequence in which sites will be addressed. At the DoD headquarters level, it also provides a framework for planning, programming, and budgeting requirements, a topic discussed further in Section 1.6.

Use of the relative risk site evaluation framework is restricted to environmental restoration sites and does not extend to unexploded ordnance (UXO) removal, building demolition/debris removal (BD/DR), potentially responsible party (PRP) activities, or compliance activities.

1.2 Rationale for Relative Risk Site Evaluation

In a 1994 report, entitled *Environmental Cleanup: Too Many High-Priority Sites Impede DoD's Program*, the General Accounting Office (GAO, 3 May 1994) concluded that the method used at that time by regulators and the DoD to determine which sites to work on first resulted in (1) too many similar priorities where too little got done, or (2) instances where DoD's worst sites were not getting priority attention. The report further stated that the approach in 1994, which was based solely on regulation-driven requirements, led to significant cost growth that strained limited resources and forced difficult choices.

Prior to 1994 and the implementation of the relative risk site evaluation concept within DoD, restoration priorities were established at the field level using a variety of methods and factors. At many installations, work priorities were established by DoD and regulatory agency personnel as part of regulatory agreement negotiations. By the end of negotiations, work sequencing was often included in legal agreements in the form of study and cleanup milestones, using information available at that time. The degree to which risk-based considerations were incorporated into scheduling milestone decisions varied considerably within DoD.

Typical legal agreements that contain milestones for sites include Federal Facility Agreements under CERCLA, permits for corrective action under the Resource Conservation and Recovery Act (RCRA), as amended; two-party agreements under federal or state law; and enforcement orders under CERCLA or RCRA, as amended. Because additional data continue to become available for many of the sites with established milestones, and in light of recent budget shortfalls and funding recisions, DoD believes that a risk-based approach should continue to be applied to work sequencing using relative risk as a key factor. The relative risk site evaluation framework described in this revised edition of the Primer provides a means of helping accomplish this objective.

1.3 Development of the Relative Risk Site Evaluation Framework

On 9 November 1993, the Deputy Under Secretary of Defense (Environmental Security) (DUSD[ES]) committed to pursuing relative risk site evaluation in the Defense Environmental Restoration Program (DERP) in consultation with regulators and communities in testimony before the Senate Committee on Energy and Natural Resources (Goodman, 1993).

On 14 April 1994, DUSD(ES) issued *Management Guidance for Execution of the FY94/95 and Development of the FY96 Defense Environmental Restoration Program* (Office of the Under Secretary of Defense [Environmental Security], 1994), which promotes the use of a risk management concept to evaluate the sequence of work at environmental restoration program sites in conjunction with the regulatory agreement status of each site. It directs each service within DoD to begin developing its environmental restoration program using a relative risk site evaluation framework.

In September 1994, DUSD(ES) issued the Interim Edition of the Primer, which contained instructions for performing relative risk site evaluations at sites across DoD. In the fall of 1995, DUSD(ES) decided to revise the Primer, resulting in the issuance of this document.

1.4 Requirements for Relative Risk Site Evaluations

Relative risk site evaluations are required for all sites at active military installations, BRAC installations, and formerly used defense properties that have future funding requirements that are not classified as (1) having “all remedies in place,” (2) ”response complete,” (3) lacking sufficient information, or (4) abandoned ordnance. These four situations are discussed in the following four paragraphs.

Relative risk site evaluations are not required (NR) for sites classified as having all remedies in place (RIP) even though they may be in remedial action operation (RAO) or long-term monitoring (LTM). A RIP determination requires that remedial action construction is complete for a site.

Relative risk site evaluations are not required (NR) for sites classified as response complete (RC). Sites classified as RC are those where a DoD Component deems that no further action (NFA) is required with the possible exception of LTM. A RC determination requires that one of the following apply: (1) there is no evidence that contaminants were released at the site, (2) no contaminants were detected at the site other than at background concentrations, (3) contaminants attributable to the site are below action levels used for risk screening, (4) the results of a baseline risk assessment demonstrate that cumulative risks posed by the site are below established thresholds, or (5) removal and/or remedial action operations (RAOs) at a site have been implemented, completed, and are the final action for the site. Only LTM remains.

Relative risk site evaluations should be based on the information currently available on contaminants, migration pathways, and receptors. Sites lacking sufficient information for the conduct of a relative risk site evaluation should be given a "Not Evaluated" designation and should then be programmed for additional study, a removal action if warranted, or other appropriate response action, including deferral, before they are evaluated.

Sites comprised solely of abandoned ordnance are not subject to the relative risk site evaluation described in this Primer. Such sites should be evaluated using a separate risk procedure, which is discussed in the management guidance cited above (Office of the Under Secretary of Defense [Environmental Security], 1994).

1.5 Implementation of the Relative Risk Site Evaluation Framework

DoD's goal is to conduct relative risk site evaluations at the field level with **the involvement** of the **regulators and public stakeholders** (see Figure 1). The technical evaluation of sites using the evaluation framework can serve as a basis for discussion and negotiation with **regulators and public stakeholders**. In particular, regulators and public stakeholders can help identify receptors, and can make judgments about the extent of contaminant migration in various environmental media at a site. Where they exist, Restoration Advisory Boards (RABs) are an excellent forum for obtaining **public stakeholder input** on these aspects of site relative risk. Other opportunities for public stakeholder involvement may also be appropriate. Regulators and public stakeholders should always **be given the opportunity** to participate in the development and review of relative risk site evaluation data before the data is used in planning and programming.

As lessons are learned during this implementation phase, DoD will continue to make appropriate adjustments and improvements to the framework through the established interservice working group, as has been done in this revised Primer.

1.6 Management Uses of Relative Risk Information

DoD and DoD Components are using the relative risk site evaluation framework as a tool to help sequence work at sites and as a headquarters program management tool. As a program management tool, the framework is being used by DoD and DoD Components to periodically identify the distribution of sites in each of three relative risk categories—high, medium, and low. A series of discrete relative risk site evaluations provides headquarters program managers with a macro-level view of changes in relative risk distributions within DoD over time.

The relative risk site evaluation framework and resulting data also provide DoD with a basis for establishing goals and performance measures for the environmental restoration program. In this regard, DoD has established goals for all DoD Components to reduce relative risk at sites in Defense Environmental Restoration Account (DERA) and BRAC programs or to have remedial systems in place where necessary for these sites, within the context of legal agreements. DoD and DoD Components are tracking progress towards these relative risk reduction goals as one of several program measures of merit (MOMs) at the headquarters level. Another MOM tracks the number of sites where cleanup action has been taken and relative risk has been reduced in one or more media. Resultant information is used to provide the necessary feedback to develop and adjust program requirements and budget projections, as well as to assess whether established goals reflect fiscal reality.

1.7 Organization of This Primer

Section 2 provides a general and factor-by-factor description of the relative risk site evaluation framework. **Section 3** provides detailed instructions for using the framework at the installation or field level to document site evaluations.

Definitions of terms used to explain general concepts and specific elements of relative risk site evaluations are found in **Section 4**. In addition, the Primer contains a reference section (**Section 5**), a list of acronyms and abbreviations (**Section 6**), and five appendices.

Appendix A contains the revised Relative Risk Site Evaluation Worksheet that is used in determining relative risk for a site.

Appendix B contains Comparison Values derived from Preliminary Remediation Goals (PRGs) used by Region IX of the U.S. Environmental Protection Agency (EPA) and from benchmarks used by other organizations for radionuclides and military-unique compounds (B-1); Ambient Water Quality Criteria developed under Section 304(a) of the Clean Water Act (B-2); and sediment screening values developed in part by the National Oceanic and Atmospheric Administration (NOAA) and by the Ontario Ministry of Environment and Energy (B-3). These comparison values are used in determining the CHF for each applicable medium, as described in later sections of this Primer.

Appendix C lists the types of regulatory agreements used in DERA and BRAC restoration programs and their codes, as well as site types and their codes.

Appendix D contains examples of relative risk site evaluations using the Relative Risk Site Evaluation Worksheet. The examples serve as a guide for performing actual site-by-site evaluations at the installation or field level.

Appendix E contains material that can be used for training or as a basis for presentations to interested parties within and outside of DoD. It contains two fact sheets and an extensive briefing. The first fact sheet summarizes the relative risk site evaluation framework. The second provides answers to common questions on the development and use of the relative risk site evaluation framework. The briefing provides information on the origin of relative risk within DoD, the relative risk work group, the structure of the framework itself and its use. It also describes how relative risk is used as a program management tool within DoD and provides technical slides that illustrate detailed aspects of the framework.